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**SUBMISSION OF VERIFIED ENGLISH TRANSLATION  
OF THE PRIORITY DOCUMENT**

Sir:

Submitted herewith is a copy of the verified English translation of the Specification, Claims and Abstract, and the Declaration of Hisako Ishido, dated December 20, 2004, that the English translation is a true English translation of the Japanese Application Number 2001-162133 filed May 30, 2001, upon which application the claim for priority is based.

Approval and acknowledgment of receipt are respectfully requested.

Respectfully submitted,

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## VERIFICATION

I, Hisako Ishido, do solemnly and sincerely declare:

1. That I am well acquainted with the Japanese and English languages, and
2. That the attached English document is a true English translation from the original text of Japanese Patent Application No. 2001-162133.  
And I make this solemn declaration conscientiously believing the same to be true and correct.

Date: December 20, 2004



Hisako Ishido



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[Title of the Invention] A method and structure for mounting an intermediate sleeve to an external sleeve

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[Title of the Invention] A method and structure for mounting an intermediate sleeve to an external sleeve

[Scope of Claim for a Patent]

[Claim 1] A method for mounting an intermediate sleeve to an inside of an external sleeve, comprising:

inserting the intermediate sleeve into the external sleeve;

inserting an ancillary sleeve into the external sleeve and the intermediate sleeve;

threading an external thread formed on an outer circumferential face of the ancillary sleeve into an internal thread formed on an inner circumferential face of the intermediate sleeve and

expanding an slit formed on the internally threaded part of the intermediate sleeve to press the internally threaded part against an inner circumferential face of the external sleeve as the above threading proceeds due to one of the externally threaded part of the ancillary sleeve and the internally threaded part of the intermediate sleeve has a tapered shape, thereby to fit the intermediate sleeve inside the external sleeve.

[Claim 2] The method for mounting an intermediate sleeve to an inside of an external sleeve, as set forth in claim 1, wherein a projection to be pressed against the inner circumferential face of the external sleeve is formed on an outer circumferential face of the internally threaded part of said intermediate sleeve.

[Claim 3] The method for mounting an intermediate sleeve to an inside of an external sleeve, as set forth in

claim 1 or 2, wherein one of an adhesive tape and an elastic member is positioned between the outer circumferential face of the internally threaded part of said intermediate sleeve and the inner circumferential face of the external sleeve.

[Claim 4] A method for mounting an intermediate sleeve to an inside of an external sleeve, comprising:

inserting the intermediate sleeve and the elastic ring adjacent to the intermediate sleeve in the axial direction into the external sleeve;

inserting the ancillary sleeve into the external sleeve from the elastic ring side;

penetrating one of a part of the ancillary sleeve and a part of the intermediate sleeve into the elastic ring;

threading an external thread formed on either one of the intermediate sleeve and the ancillary sleeve into an internal thread formed on the other one of the intermediate sleeve and the ancillary sleeve;

compressing the elastic ring in the axial direction between the ancillary sleeve and the intermediate sleeve to be pressed against an inner circumferential face of the external sleeve as the ancillary sleeve, as the ancillary sleeve advances to the intermediate sleeve, to be fixed to the external sleeve, thereby resulting in the fitting of the intermediate sleeve inside the external sleeve.

[Claim 5] The method for mounting an intermediate sleeve to an inside of an external sleeve, as set forth in claim 4, wherein a step face for coming into contact with said elastic ring is formed on said ancillary sleeve, and the step face is inclined in relation to the direction of

the external diameter.

[Claim 6] A method for mounting an intermediate sleeve to an inside of an external sleeve, comprising:

fitting a C-ring into an annular concave part formed on an inner circumferential face of the external sleeve, in such a manner that the C-ring projects more in the direction of the internal diameter than the inner circumferential face of the external sleeve;

inserting a part of the intermediate sleeve into the external sleeve from one end of the external sleeve;

bringing the other part of the intermediate sleeve not inserted into the external sleeve into contact with the one end of the external sleeve;

inserting the ancillary sleeve into the external sleeve from the other end of the external sleeve

penetrating one of a part of the ancillary sleeve and a part of the intermediate sleeve into the C-ring,

threading an external thread formed on either one of the intermediate sleeve and the ancillary sleeve into an internal thread formed on the other one of the intermediate sleeve and the ancillary sleeve;

bringing the ancillary sleeve into contact with the part of the C-ring projecting more than the inner circumferential face of the external sleeve from the other end side of the external sleeve, thereby resulting in fitting the intermediate sleeve inside the external sleeve.

[Claim 7] A mounting structure for mounting an intermediate sleeve to an inside of an external sleeve with an aid of an ancillary sleeve, wherein:

an internal thread is formed on an inner

circumferential face of the intermediate sleeve and a slit is formed on the internally threaded part of the intermediate sleeve;

an external thread is formed on an outer circumferential face of the ancillary sleeve;

one of the externally threaded part of the ancillary sleeve and the internally threaded part of the intermediate sleeve has a tapered shape; and

the external thread of said ancillary sleeve inserted into the external sleeve and the intermediate sleeve engages the internal thread of the intermediate sleeve inserted into the external sleeve, the slit of the intermediate sleeve being expanded to press the internally threaded part against an inner circumferential face of the external sleeve to fix the intermediate sleeve to the external sleeve, thereby to fit the intermediate sleeve inside the external sleeve.

[claim 8] The mounting structure as set forth in claim 7, wherein a projection to be pressed against the inner circumferential face of the external sleeve is formed on an outer circumferential face of the internally threaded part of said intermediate sleeve.

[claim 9] The mounting structure as set forth in claim 7 or claim 8, wherein one of an adhesive tape and an elastic member is positioned between the outer circumferential face of the internally threaded part of said intermediate sleeve and the inner circumferential face of the external sleeve.

[claim 10] A mounting structure for mounting an intermediate sleeve to an inside of an external sleeve with

an aid of an ancillary sleeve and an elastic ring, wherein an internal thread is formed on either one of the intermediate sleeve and the ancillary sleeve, and an external thread to engage the internal thread is formed on the other one of the intermediate sleeve and the ancillary sleeve;

the intermediate sleeve and the elastic ring adjacent to the intermediate sleeve in the axial direction, are inserted into the external sleeve,

the ancillary sleeve is inserted into the external sleeve from the elastic ring side,

one of a part of the ancillary sleeve and a part of the intermediate sleeve penetrates the elastic ring,

the threaded engagement of said external thread and internal thread with each other serves to combine the intermediate sleeve and the ancillary sleeve, and

the elastic ring is compressed in the axial direction between the ancillary sleeve and the intermediate sleeve to be pressed against an inner circumferential face of the external sleeve and thereby to be fixed to the external sleeve, thereby resulting in the fitting of the intermediate sleeve inside the external sleeve.

[claim 11] The mounting structure as set forth in claim 10, wherein a step face for coming into contact with said elastic ring is formed on said ancillary sleeve, and the step face is inclined in relation to the direction of the external diameter.

[claim 12] A mounting structure for mounting an intermediate sleeve to an inside of an external sleeve with an aid of an ancillary sleeve and a C ring wherein

an annular concave part is formed on an inner circumferential face of the external sleeve, and the C-ring is fitted into the annular concave part to

an internal thread is formed on either one of the intermediate sleeve and the ancillary sleeve, and an external thread to engage the internal thread is formed on the other one of the intermediate sleeve and the ancillary sleeve;

a part of the intermediate sleeve is inserted into the external sleeve from one end of the external sleeve, and the other part of the intermediate sleeve not inserted into the external sleeve is brought into contact with the one end of the external sleeve; and

the ancillary sleeve is inserted into the external sleeve from the other end of the external sleeve, one of a part of the ancillary sleeve and a part of the intermediate sleeve penetrates the C-ring, the threaded engagement of said external thread with the internal thread serves to combine the intermediate sleeve and the ancillary sleeve, and the ancillary sleeve comes into contact with the part of the C-ring projecting more than the inner circumferential face of the external sleeve from the other end side of the external sleeve, thereby resulting in fitting the intermediate sleeve inside the external sleeve.

[Detailed Description of the Invention]

[0001]

[Technical Field the Invention belongs]

The present invention relates to a method for mounting

an intermediate sleeve to an inside of an external sleeve and a mounting structure for mounting an intermediate sleeve to an external sleeve, and the external sleeve can be applied to one for writing-related use, cosmetic media or data inputting media.

[0002]

[Description of the Related Art]

Conventionally, there is a need for mounting an intermediate sleeve as one component to an inside of an external sleeve. In this case, a thread engagement, adhesive or snap engagement is well known as a method for mounting an intermediate sleeve to an inside of an external sleeve a method. The thread engagement is a method wherein an internal thread formed on an inner circumferential face of the external sleeve, is threaded into an external thread formed on an outer circumferential face of the intermediate sleeve. The adhesive is a method wherein liquid or gel adhesive is applied to the outer circumferential face of the intermediate sleeve and the intermediate sleeve is inserted into the outer sleeve, then the adhesive is dried to fix the intermediate sleeve to the external sleeve. The snap engagement is a method wherein an opening is formed on the circumferential face of the external sleeve and the engaged strip is formed on the intermediate sleeve and the engaged strip of the intermediate sleeve is snapped with the opening of the external sleeve.

[Problems to be solved by the Invention]

[0003]

However, the above conventional methods for mounting

have problems that applying range is limited. The thread engagement requires a relative rotation relationship between the external sleeve and intermediate sleeve. If the formation of thread is impossible for the external sleeve, the thread engagement cannot be available.

[0004]

In the case of the adhesive, it takes long time to completely dry up, and the operation must be careful to stick the adhesive to the other component and the operation efficiency is bad.

[0005]

Furthermore, the snap engagement requires a formation of opening on the external sleeve, thus, aesthetic of the external sleeve is impaired.

[0006]

In view of the foregoing and other problems, drawbacks, and disadvantages of the conventional methods, an object of the present invention is to provide a method for mounting an intermediate sleeve to an inside of an external sleeve and a mounting structure for mounting an intermediate sleeve to an external sleeve that have a wide applicability and can improve operational efficiency without impairing the aesthetic of the external sleeve.

[0007]

[Means for Solving the Problems]

To achieve the objects stated above and others, according to the present invention described in claim 1, a method for mounting an intermediate sleeve to an inside of an external sleeve, comprises:

inserting the intermediate sleeve into the external

sleeve;

inserting an ancillary sleeve into the external sleeve and the intermediate sleeve;

threading an external thread formed on an outer circumferential face of the ancillary sleeve into an internal thread formed on an inner circumferential face of the intermediate sleeve and

expanding an slit formed on the internally threaded part of the intermediate sleeve to press the internally threaded part against an inner circumferential face of the external sleeve as the above threading proceeds due to one of the externally threaded part of the ancillary sleeve and the internally threaded part of the intermediate sleeve has a tapered shape, thereby to fit the intermediate sleeve inside the external sleeve.

[0008]

According to the invention described in claim 2 in one described in claim 1, a projection to be pressed against the inner circumferential face of the external sleeve is formed on an outer circumferential face of the internally threaded part of said intermediate sleeve. According to the invention described in claim 3 in one described in claim 1 or 2, one of an adhesive tape and an elastic member is positioned between the outer circumferential face of the internally threaded part of said intermediate sleeve and the inner circumferential face of the external sleeve.

[0009]

According to the invention described in claim 4, a method for mounting an intermediate sleeve to an inside of an external sleeve, comprising:

inserting the intermediate sleeve and the elastic ring adjacent to the intermediate sleeve in the axial direction into the external sleeve;

inserting the ancillary sleeve into the external sleeve from the elastic ring side;

penetrating one of a part of the ancillary sleeve and a part of the intermediate sleeve into the elastic ring;

threading an external thread formed on either one of the intermediate sleeve and the ancillary sleeve into an internal thread formed on the other one of the intermediate sleeve and the ancillary sleeve;

compressing the elastic ring in the axial direction between the ancillary sleeve and the intermediate sleeve to be pressed against an inner circumferential face of the external sleeve as the ancillary sleeve, as the ancillary sleeve advances to the intermediate sleeve, to be fixed to the external sleeve, thereby resulting in the fitting of the intermediate sleeve inside the external sleeve.

[0010]

According to the invention described in claim 5 in one described in claim 4, a step face for coming into contact with said elastic ring is formed on said ancillary sleeve, and the step face is inclined in relation to the direction of the external diameter.

[0011]

According to the invention described in claim 6, a method for mounting an intermediate sleeve to an inside of an external sleeve, comprises:

fitting a C-ring into an annular concave part formed on an inner circumferential face of the external sleeve, in

such a manner that the C-ring projects more in the direction of the internal diameter than the inner circumferential face of the external sleeve;

inserting a part of the intermediate sleeve into the external sleeve from one end of the external sleeve;

bringing the other part of the intermediate sleeve not inserted into the external sleeve into contact with the one end of the external sleeve;

inserting the ancillary sleeve into the external sleeve from the other end of the external sleeve

penetrating one of a part of the ancillary sleeve and a part of the intermediate sleeve into the C-ring,

threading an external thread formed on either one of the intermediate sleeve and the ancillary sleeve into an internal thread formed on the other one of the intermediate sleeve and the ancillary sleeve;

bringing the ancillary sleeve into contact with the part of the C-ring projecting more than the inner circumferential face of the external sleeve from the other end side of the external sleeve, thereby resulting in fitting the intermediate sleeve inside the external sleeve.

[0012]

According to the invention described in claim 7, in a mounting structure for mounting an intermediate sleeve to an inside of an external sleeve with an aid of an ancillary sleeve,

an internal thread is formed on an inner circumferential face of the intermediate sleeve and a slit is formed on the internally threaded part of the intermediate sleeve;

an external thread is formed on an outer circumferential face of the ancillary sleeve;

one of the externally threaded part of the ancillary sleeve and the internally threaded part of the intermediate sleeve has a tapered shape; and the external thread of said ancillary sleeve inserted into the external sleeve and the intermediate sleeve engages the internal thread of the intermediate sleeve inserted into the external sleeve, the slit of the intermediate sleeve being expanded to press the internally threaded part against an inner circumferential face of the external sleeve to fix the intermediate sleeve to the external sleeve, thereby to fit the intermediate sleeve inside the external sleeve.

[0013]

According to the invention described in claim 8 in one described in claim 7, a projection to be pressed against the inner circumferential face of the external sleeve is formed on an outer circumferential face of the internally threaded part of said intermediate sleeve. According to the invention described in claim 9 in one described in claim 7 or 8, one of an adhesive tape and an elastic member is positioned between the outer circumferential face of the internally threaded part of said intermediate sleeve and the inner circumferential face of the external sleeve.

[0014]

According to the invention described in claim 10, in a mounting structure for mounting an intermediate sleeve to an inside of an external sleeve with an aid of an ancillary sleeve and an elastic ring,

an internal thread is formed on either one of the intermediate sleeve and the ancillary sleeve, and an external thread to engage the internal thread is formed on the other one of the intermediate sleeve and the ancillary sleeve;

the intermediate sleeve and the elastic ring adjacent to the intermediate sleeve in the axial direction, are inserted into the external sleeve,

the ancillary sleeve is inserted into the external sleeve from the elastic ring side,

one of a part of the ancillary sleeve and a part of the intermediate sleeve penetrates the elastic ring,

the threaded engagement of said external thread and internal thread with each other serves to combine the intermediate sleeve and the ancillary sleeve, and the elastic ring is compressed in the axial direction between the ancillary sleeve and the intermediate sleeve to be pressed against an inner circumferential face of the external sleeve and thereby to be fixed to the external sleeve, thereby resulting in the fitting of the intermediate sleeve inside the external sleeve.

[0015]

According to the invention described in claim 11 in one described in claim 10, a step face for coming into contact with said elastic ring is formed on said ancillary sleeve, and the step face is inclined in relation to the direction of the external diameter.

[0016]

According to the invention described in claim 12, in a mounting structure for mounting an intermediate sleeve to

an inside of an external sleeve with an aid of an ancillary sleeve and a C ring,

an annular concave part is formed on an inner circumferential face of the external sleeve, and the C-ring is fitted into the annular concave part to

an internal thread is formed on either one of the intermediate sleeve and the ancillary sleeve, and an external thread to engage the internal thread is formed on the other one of the intermediate sleeve and the ancillary sleeve;

a part of the intermediate sleeve is inserted into the external sleeve from one end of the external sleeve, and the other part of the intermediate sleeve not inserted into the external sleeve is brought into contact with the one end of the external sleeve; and

the ancillary sleeve is inserted into the external sleeve from the other end of the external sleeve, one of a part of the ancillary sleeve and a part of the intermediate sleeve penetrates the C-ring, the threaded engagement of said external thread with the internal thread serves to combine the intermediate sleeve and the ancillary sleeve, and the ancillary sleeve comes into contact with the part of the C-ring projecting more than the inner circumferential face of the external sleeve from the other end side of the external sleeve, thereby resulting in fitting the intermediate sleeve inside the external sleeve.

[0017]

According to the invention, by a simple operation

mainly including the threaded engagement of the intermediate sleeve with the ancillary sleeve, the intermediate sleeve can be fitted to the external sleeve with the assistance of the ancillary sleeve without adversely affecting the looks of the external sleeve. This manner of fitting is applicable even where the configuration forbids the rotation of the intermediate sleeve in relation to the external sleeve, threading is impossible on either the external sleeve or the intermediate sleeve, or either the intermediate sleeve or the external sleeve includes a non-adhesive material, resulting in an expanded range of applicability.

[0018]

If a projection is formed on the outer circumferential face of the internally threaded part of the intermediate sleeve to be pressed against the inner circumferential face of the external sleeve, the projection can serve to enhance the binding force between the intermediate sleeve and the external sleeve. Further, an adhesive tape or elastic member formed between the outer circumferential face of the internally threaded part of the intermediate sleeve and the inner circumferential face of the external sleeve, further enhances the binding force between the intermediate sleeve and the external sleeve.

[0019]

Where the intermediate sleeve is to be fitted to the external sleeve with the assistance of the ancillary sleeve and the elastic ring, as the elastic ring elastically contacts the ancillary sleeve and/or the intermediate sleeve to forbid the ancillary sleeve and the intermediate

sleeve from rotating in relation to each other, the threaded engagement between the ancillary sleeve and the intermediate sleeve is prevented from loosening, thereby resulting in a secure fitting of the intermediate sleeve to the external sleeve. When the step is formed on the ancillary sleeve to come into contact with the elastic ring, and the step face is inclined in relation to the direction of the external diameter, the elastic ring is progressively pressed in the direction of the external diameter of the external sleeve as the ancillary sleeve approaches the elastic ring.

[0020]

Where the intermediate sleeve is to be fitted to the external sleeve with the assistance of the ancillary sleeve and the C-ring, by bringing the ancillary sleeve into contact with the C-ring from the other end side of the external sleeve and bringing the part of the intermediate sleeve not inserted into the external sleeve into contact with one end of the external sleeve, the intermediate sleeve can be securely fitted to the external sleeve. Where a part of the ancillary sleeve or a part of the intermediate sleeve penetrating the C-ring comes into frictional contact with the C-ring, as the ancillary sleeve and the intermediate sleeve are prohibited from rotation in relation to each other, the threaded engagement between the ancillary sleeve and the intermediate sleeve is prevented from loosening, thereby resulting in secure fitting of the intermediate sleeve to the external sleeve.

[0021]

[Mode for Carrying Out the Invention]

Embodiments of the present invention will be described below with reference to the accompanying drawings. The invention is applicable to the external sleeve for writing-related use, cosmetic media or data inputting media, an example in which the invention is applied to the writing tool is described hereinafter.

[0022]

Fig. 1 shows an overall longitudinal section of an embodiment of a writing tool 10 having a cap 14 to which the mounting method and mounting structure according to the present invention are applied.

[0023]

The writing tool 10 is provided with a holder body 12 and a cap 14 detachably covering the holder body 12. Into the holder body 12 is incorporated a refill 16 having a ball at a tip 16a and containing ink, thereby enabling holder body 12 to hold ink. The cap 14, which is intended to protect the tip 16a of the refill 16 to prevent the ink within from evaporating and drying when the refill 16 is not in use, also contains a plurality of holders 21 and 22.

Here, the holders is referred to one holding a plurality of media for writing-related use (e.g., a pencil lead, an ink, a stick glue, an eraser and a correctional fluid), cosmetic media (e.g., a lipstick, an eye pencil, an eyeliner and an eyebrow pencil) or data inputting media (e.g., a stylus tip). The holders 21 and 22 in the illustrated example are two ballpoint refills.

[0024]

The casing 20 includes an external sleeve 30, an intermediate sleeve 32 and a nose 34. Hereinbelow, the nose 34 side represents the "fore side", and the other side represents the "rear side". The rear end of the intermediate sleeve 32 is inserted into the external sleeve 30 and fixed there and inside the intermediate sleeve 32 is fixed an internal sleeve 46 to serve as the ancillary sleeve. The intermediate sleeve 32 is integrally fixed to the external sleeve with the assistance of the internal sleeve 46 as will be described in detail hereinbelow. The internal space of the internal sleeve 46 accommodates the tip 16a of the refill 16 of the writing body 12.

[0025]

As shown in Fig. 2, the boundary shape linking the tip of the intermediate sleeve 32 not inserted into the external sleeve 30 but exposed to the outside, and the tip of the external sleeve 30 to each other, is not a true circle normal to the axial direction, but preferably is an ellipse inclined at an angle to the axial direction. Therefore, the external sleeve 30 and the intermediate sleeve 32 cannot rotate in relation to each other, and at the tip part of the inclined boundary ellipse the base of a clip 36 is pinched between the intermediate sleeve 32 and the external sleeve 30.

[0026]

The nose 34 is arranged on a side of the tip of, and to be capable of rotating in relation to, the intermediate

sleeve 32. Namely, the nose 34 is threaded onto a threaded part 40e formed on the outer circumferential face of the tip of a slide receptacle 40 arranged within the intermediate sleeve 32 of the casing 20, and the nose 34 and the slide receptacle 40 rotate integrally in a state in which the nose 34 is threaded on the slide receptacle 40. The tip of either one of the holders 21 and 22 is selectively projected out of an fore end opening 34a at the tip of the nose 34.

[0027]

The slide receptacle 40 threaded into the nose 34 extends in the axial direction within the intermediate sleeve 32. As shown in Figs. 5 and 10, at the rear end of the slide receptacle 40 are formed engaging pieces 40a and 40a, which are engaged with a stepped part 32b, formed at the rear end of the intermediate sleeve 32, to be rotatable relative thereto. Farther inside than the engaging pieces 40a and 40a in the radial direction is fitted a head part 46a of the internal sleeve 46 to prevent the engaging pieces 40a and 40a from falling inwardly in the radial direction and thereby not to let the engaging pieces 40a disengage the stepped part 32b.

[0028]

Further, on the slide receptacle 40 are formed as many guide grooves 40b as the holders 21 and 22 to be accommodated extending in the axial direction, and the holders 21 and 22 are arranged within the respective guide grooves 40b to be movable in the axial direction. Namely, at the rear end of each of the holders 21 and 22 is provided a holder receptacle 50 as the supported section.

The holder receptacle 50 is supported by a slider 52, which is the supporting section 23, and the slider 52 is slidably fitted into the guide groove 40b of the slide receptacle 40.

[0029]

On the inner circumferential face of the front portion of the intermediate sleeve 32 is formed a cam face 32a including a forward step face and inclined in the axial direction, and a projection 52b of the slider 52 is in contact with this cam face 32a. This cam face 32a is substantially V-shaped as the expansion plan view of Fig. 11 shows, and its projecting end is positioned toward the tip. At this projecting end is formed an engaging part 32a1 constituting a small dent in the cam face 32a. The projection 52b of the slider 52 can slide along this cam face 32a. To ensure the contact of the slider 52 with the cam face 32a, a return spring 54 intervenes between the slider 52 and a partition wall 40c of the slide receptacle 40, so that the return spring 54 pushes the slider 52 backward.

[0030]

The use of either one of the holders 21 and 22 is accomplished in the following manner. Namely, the nose 34 is turned in a prescribed direction in relation to the rear sleeve 32, which causes the slide receptacle 40 integrated with the nose 34 to be turned in the prescribed direction in relation to the rear sleeve 32. As the sliders 52 and 52 fitted into the guide grooves 40b of the slide receptacle 40 also turn integrally, each of the projections

52b of the sliders 52 moves in the axial direction along the cam face 32a, and one of the two sliders 52 advances, whereas the other recedes. If the holder receptacle 50 of the holder 21 is supported by the advanced slider 52, then the holder 21 will advance together with the slider 52.

[0031]

The slider 52 having advanced along the cam face 32a, when engaged with the engaging part at the tip of the cam face 32a, stops in the position to which it has advanced. In this way, the tip of the holder 21 supported by the slider 52 is held in a state of projection from the fore end opening 34a, as shown in Fig. 3, in which the holder 21 becomes usable. The slider 52 supporting the holder receptacle 50 of the other holder 22 recedes along the cam face 32a, and stops in the receded position.

[0032]

In order to operate reliably, it is necessary for the intermediate sleeve 32, on which the cam face 32a is formed, to be securely fitted to and integrated with the external sleeve 30. The mounting the intermediate sleeve 32 to the external sleeve 30 will be described below.

[0033]

As shown in Figs. 4 and 5, an internal thread 32c is formed on an inner circumferential face of the rear end of the intermediate sleeve 32, and on the intermediate sleeve 32 a pair of mutually opposite slits 32d, extending from the end part in the axial direction, are further formed on its internally threaded part where the internal thread 32c

is formed. The number of slits 32d is not limited to two as in this case, but may be one, or three or more. Further on an outer circumferential face of the internally threaded part of the intermediate sleeve 32 are formed a plurality of projections 32e extending in the axial direction, appropriately separated from each other in the circumferential direction. Preferably, an elastic ring (elastic member) 44 may be mounted on the outer circumferential face of the internally threaded part of this intermediate sleeve 32. The elastic ring 44 may include an elastomer, soft synthetic resin or the like.

[0034]

Further, as shown in Figs. 4 and 6, on an outer circumferential face of the tip of (or a part of) an internal sleeve 46 is formed an external thread 46b to engage with the internal thread 32c, and an outer circumferential face of this externally threaded part constitutes a tapered face 46c whose external diameter gradually increases from the tip toward the rear part. Tool grooves 46d for letting in screw drivers and other tools for fitting use are also formed at appropriate intervals in the circumferential direction on an inner circumferential face of the internal sleeve 46.

[0035]

The assembly operation is performed as follows. First, the rear end of the intermediate sleeve 32 is inserted into the external sleeve 30 and set in a suitable position. Then, the internal sleeve 46 is inserted into the external sleeve 30 and into the intermediate sleeve 32, and a tool is placed into the tool grooves 46d on the inner

circumferential face of the internal sleeve 46 to turn the internal sleeve 46, thereby to screw the external thread 46b in the tip part of the internal sleeve 46 onto the internal thread 32c on the intermediate sleeve 32. As the threading operation is continued, the tapered face 46c of the internal sleeve 46 expands the slits 32d at the rear end of the intermediate sleeve 32 to expand the internally threaded part of the intermediate sleeve 32 in the direction of the external diameter. As a result, the intermediate sleeve 32, especially its projections 32e, is pressed toward an inner circumferential face of the external sleeve 30. In this process, the elastic ring 44 mounted on the outer circumferential face of the internally threaded part of the intermediate sleeve 32 is compressed between the outer circumferential face of the intermediate sleeve 32 and the inner circumferential face of the external sleeve 30.

[0036]

This causes the rear end of the intermediate sleeve 32 to be fitted to the inner circumferential face of the external sleeve 30, so that the intermediate sleeve 32 is firmly fixed to the external sleeve 30. Thus, the assembly operation can be accomplished efficiently, instead of taking a long time as adhesion would, without adversely affecting the appearance of the external sleeve 30. Further, as the projections 32e formed at appropriate intervals on the outer circumferential face of the intermediate sleeve 32 press the elastic ring 44 farther toward the inner circumferential face of the external sleeve 30, the friction may be increased with the inner

circumferential face of the external sleeve 30 and accordingly the binding force. However, a double or single-face adhesive tape can be set between the outer circumferential face of the intermediate sleeve 32 and the inner circumferential face of the external sleeve 30 in place of the elastic ring 44. The adhesive tape may be a pressure-sensitive adhesive tape. Where an adhesive tape may be preferable to dispense with the projections 32e on the other circumferential face of the intermediate sleeve 32. Or, if desired, neither an adhesive tape nor the elastic ring 44 need be used, but instead the outer circumferential face of the intermediate sleeve 32 can be crimped directly onto the inner circumferential face of the external sleeve 30.

[0037]

In the illustrated example, the outer circumferential face of the externally threaded part of the internal sleeve 46 is tapered. However, it is also conceivable to taper the inner circumferential face of the internally threaded part of the intermediate sleeve 32, so that the slits 32d of the intermediate sleeve 32 can be expanded as the screwing onto the internal sleeve 46 advances to expand the internally threaded part of the intermediate sleeve 32 in the direction of the external diameter.

[0038]

Fig. 8 illustrates the structure of a second embodiment of the invention. In Figure, the same members as in the first embodiment are assigned respectively the same reference numerals, and their detailed description will be omitted.

[0039]

This embodiment differs from the first embodiment in that an elastic ring 48 is arranged adjoining an intermediate sleeve 32-1 within the external sleeve 30. Thus, the elastic ring 48 intervenes between a rear end face of the intermediate sleeve 32-1 and a step face 46e formed on an outer circumferential face in the part of the internal sleeve 46-1 not inserted into the intermediate sleeve 32-1. The elastic ring 48 may include an elastomer, soft synthetic resin or the like.

[0040]

Slits 32d may be formed on the rear end part of the intermediate sleeve 32-1 as in the first embodiment. However, in this third embodiment, the slits 32d also could be dispensed with.

[0041]

The step face 46e of the internal sleeve 46-1 may be a vertical face normal to the axial direction, but more preferably is inclined. The inclined face preferably should face the elastic ring 48 as well as the direction of the external diameter. The outer circumferential face in the tip part of the internal sleeve 46-1 need not be tapered like the tapered face 46c in the first embodiment, but may be parallel to the axial direction.

[0042]

Assembly work for this embodiment is carried out in the following manner. First, the rear end of the intermediate sleeve 32-1 is inserted into the external sleeve 30 and set in a suitable position, and similarly the elastic ring 48 is inserted into the external sleeve 30 and

positioned adjacent to the intermediate sleeve 32-1. Then, the internal sleeve 46-1 is inserted into the external sleeve 30 and into the intermediate sleeve 32-1, and a tool is placed into the tool grooves 46d on the inner circumferential face of the internal sleeve 46-1 to turn the internal sleeve 46-1, thereby to thread the external thread 46b in the tip part of the internal sleeve 46-1 onto the internal thread 32c on the intermediate sleeve 32-1. As the threading is continued and the internal sleeve 46-1 is moved toward the intermediate sleeve 32-1, the step face 46e of the internal sleeve 46-1 comes into contact with the rear end of the elastic ring 48, and the elastic ring 48, pinched between the intermediate sleeve 32-1 and the step face 46e of the internal sleeve 46-1, is compressed in the axial direction. This causes the elastic ring 48 to expand in the radial direction, and to press against the inner circumferential face of the external sleeve 30. In this process, as the step face 46e of the internal sleeve 46-1 is inclined, the elastic ring 48 is progressively pressed in the direction of the external diameter as the step face 46e approaches the elastic ring 48. Hence, the elastic ring 48 is fixed within the external sleeve 30. Further, as the intermediate sleeve 32-1 and the internal sleeve 46-1 are threaded onto each other to pinch the elastic ring 48 between them, the rear end of the intermediate sleeve 32-1 becomes immovable in relation to the external sleeve 30, so that the intermediate sleeve 32-1 is firmly fitted to the external sleeve 30.

[0043]

The compressed elastic ring 48 is subjected to

expansion forces in all directions, and the elastic ring 48, elastically in contact with the intermediate sleeve 32-1 and the internal sleeve 46-1, causes frictional forces to arise between them. These frictional forces prevent the intermediate sleeve 32-1 and the internal sleeve 46-1 from being rotationally moved inadvertently, and the threaded fitting between the internal sleeve 46-1 and the intermediate sleeve 32-1 is prevented from loosening.

[0044]

The elastic ring 48 need not be long in the axial direction. That is, obviously a short O-ring 48-1 could similarly function as shown in Fig. 9 as a variation of the second embodiment of the invention.

[0045]

In the embodiments illustrated in Fig. 8 and Fig. 9, the intermediate sleeve 32-1 and the internal sleeve 46-1 are linked together by threaded engagement of the internal thread 32c of the intermediate sleeve 32-1 and the external thread 46b of the internal sleeve 46-1 with each other. However, the linking arrangement is not limited thereto. An external thread also could be formed on the intermediate sleeve, and an internal thread to engage with the external thread on the intermediate sleeve, may be formed on the internal sleeve. Further, the rear end part of the intermediate sleeve, instead of the tip part of the internal sleeve, could be caused to penetrate the elastic ring 48 to link the intermediate sleeve and the internal sleeve.

[0046]

Next, Fig. 10 illustrates a third embodiment of the

present invention. In the drawing, the same members as in the first and third embodiments are assigned respectively the same reference numerals, and thus their detailed description will be omitted.

[0047]

On an inner circumferential face of the external sleeve 30-2 in this embodiment is formed an annular concave part 30a. Into this annular concave part 30a is fitted a C-ring 49. The C-ring 49, which may be made of either metal or resin, has one cut part as shown in Fig. 26, and can be deformed by either expansion or compression in the radial direction. Therefore, when the C-ring 49 is to be fitted into the annular concave part 30a of the external sleeve 30-2, it can be accomplished by shifting the C-ring 49 within the external sleeve 30-2 to the annular concave part 30a while compressing it in the direction of the internal diameter. The C-ring 49, in the state of being fitted into the annular concave part 30a, the most inward part of the C-ring 49 projects more in the direction of the internal diameter than any part of the inner circumferential face other than the annular concave part 30a of the external sleeve 30-2.

[0048]

A step face 46f to be in contact with the C-ring 49 projecting in the direction of the internal diameter is formed on the outer circumferential face of the internal sleeve 46-2.

[0049]

There is no need to form slits 32d, like those in the first embodiment, at the rear end of the intermediate

sleeve 32-2. Further, it is unnecessary to taper the outer circumferential face of the tip of the internal sleeve 46-2 like the tapered face 46c in the first embodiment.

[0050]

Assembly work for this embodiment is carried out in the following manner. First, the C-ring 49 is fitted in advance in the annular concave part 30a of the external sleeve 30-2 as described above. Then, the rear end of the intermediate sleeve 32-2 is inserted from the tip of the external sleeve 30-2 to bring into contact a step face 32f, which forms the boundary line between the tip part and the rear end part of the intermediate sleeve 32-2, with the tip face 30b of the external sleeve 30-2. Preferably, then, the rear end part of the intermediate sleeve 32-2, which is its inserted end, and the C-ring 49 are separated from each other in the axial direction. Then, the internal sleeve 46-2 is inserted from the rear end of the external sleeve 30-2, and the tip of the internal sleeve 46-2 is caused to penetrate the C-ring 49 and inserted into the intermediate sleeve 32-2. A tool is placed into the tool grooves 46d on the inner circumferential face of the internal sleeve 46-2 to turn the internal sleeve 46-2, thereby to thread the external thread 46b in the tip part of the internal sleeve 46-2 onto the internal thread 32c on the intermediate sleeve 32-2. As the threading is continued and the internal sleeve 46-2 is moved toward the intermediate sleeve 32-2, the step face 46f of the internal sleeve 46-2 comes into contact with the rear end of the C-ring 49, and the internal sleeve 46-2 can be moved no farther toward the intermediate sleeve 32-2. In this state, the intermediate

sleeve 32-2 and the internal sleeve 46-2 linked by the threading pinch between the tip face 30b of the external sleeve 30-2 and the rear end face of the C-ring 49, with the result that the intermediate sleeve 32-2 is firmly fitted to the external sleeve 30-2. In this embodiment, the intermediate sleeve 32-2 can be more firmly fitted to the external sleeve 30-2. Further, where the internal diameter of the C-ring and the external diameter of the tip part of the internal sleeve 46-2 are so set that the tip part of the internal sleeve 46-2 penetrating the C-ring 49 come into contact with the inner circumferential face of the C-ring 49, frictional forces arise between them. These frictional forces prevent the internal sleeve 46-2 from being turned inadvertently, thereby preventing the threaded fitting between the internal sleeve 46-2 and the intermediate sleeve 32-2 from loosening.

[0051]

In the embodiment illustrated in Fig.10, the intermediate sleeve 32-2 and the internal sleeve 46-2 are linked together by threaded engagement of the internal thread 32c of the intermediate sleeve 32-2 and the external thread 46b of the internal sleeve 46-2 with each other, but the linking arrangement is not limited thereto. An external thread could be formed on the intermediate sleeve, and an internal thread to engage with the external thread on the intermediate sleeve, on the internal sleeve may be formed. The rear end part of the intermediate sleeve (instead of the tip part of the internal sleeve) could be caused to penetrate the C-ring 49 to link the intermediate sleeve and the internal sleeve.

[0052]

The above explanation is the case in which the present invention is applied to the cap of the writing tool, however it is also applied to any external sleeve and like for stationary other than the writing tool or cosmetic.

[0053]

[Effects of the Invention]

According to the present invention, by a simple operation including the threaded engagement of the intermediate sleeve with the ancillary sleeve, the intermediate sleeve can be fitted to the external sleeve with the assistance of the ancillary sleeve without adversely affecting the looks of the external sleeve. This manner of fitting is applicable even where the configuration forbids the rotation of the intermediate sleeve in relation to the external sleeve, threading is impossible on either the external sleeve or the intermediate sleeve, or either the intermediate sleeve or the external sleeve includes a non-adhesive material, resulting in an expanded range of applicability.

[BRIEF DESCRIPTION OF THE DRAWINGS]

Fig.1 is an overall longitudinal section of an embodiment of a writing tool having a cap to which the present invention are applied.

Fig.2 is an overall view of the writing tool of Fig. 1.

Fig.3 is an overall longitudinal section of an embodiment showing a state in which one holder is projected.

Fig.4 is an expanded section of the fitting structure illustrated in Fig. 1.

Fig. 5 (a)-(c) illustrate the intermediate sleeve of the

fitting structure shown in Fig.1, with (a) showing a plan view, (b) showing a sectional view, and Fig. (c) showing another sectional view as viewed along 5c-5c in Fig.1.

Figs. 6(a) and 6(b) illustrate an internal sleeve of the fitting structure shown in Fig.1, with Fig. (a) showing a plan view, and Fig. (b) showing a sectional view.

Fig. 7 is a section of an interim state of the assembly of the first embodiment of the invention, corresponding to the drawing shown in Fig.4.

Fig. 8 is a section of the fitting structure in the second embodiment of the invention.

Fig. 9 is a section of a variation of the second embodiment of the invention.

Fig. 10 is a section of the fitting structure in the third embodiment of the invention.

Fig. 11 is a front view of the C-ring for use in the configuration shown in Fig. 10.

[Reference Numerals in the Drawings]

30,30-2 external sleeve

30b tip face

32, 32-1, 32-2 intermediate sleeve

32c internal thread

32d slits

32e projection

32f step face

44 elastic ring

46, 46-1, 46-2 internal sleeve (ancillary sleeve)

46b external thread

46c tapered face

46e step face

48 elastic ring

48-1 O-ring (elastic ring)

49 C-ring

[Document Name] Abstract

[Abstract]

[Object] to provide a method for mounting an intermediate sleeve to an inside of an external sleeve and a mounting structure for mounting an intermediate sleeve to an external sleeve that have a wide applicability and can improve operational efficiency without impairing the aesthetic of the external sleeve.

[Construction] The intermediate sleeve 32 is inserted into the into the external sleeve 30, the inner sleeve 46 is inserted into the external sleeve 30 and the intermediate sleeve 32, an external thread 46b formed on an outer circumferential tapered face of the inner sleeve 46 is threaded into an internal thread 32c formed on an inner circumferential face of the intermediate sleeve 32 and an slit 32d formed on the internally threaded part of the intermediate sleeve 32 is expanded to press the internally threaded part of the intermediate sleeve 32 against an inner circumferential face of the external sleeve 30 as the above threading proceeds, thereby to fit the intermediate sleeve inside the external sleeve.

[Selected Drawing] Fig.4